

Amendments to the Claims:

This listing of claims will replace all prior versions, and listing, of claims in the application.

1. (Previously presented) A remote-plasma atomic film deposition apparatus comprising:
 - a reaction chamber in which wafers are loaded;
 - an exhaust line for exhausting gas from the reaction chamber;
 - a first reactive gas supply unit for selectively supplying a first reactive gas to the reaction chamber or the exhaust line;
 - a first reactive gas transfer line for connecting the first reactive gas supply unit and the reaction chamber;
 - a first bypass line for connecting the first reactive gas supply unit and the exhaust line;
 - a radical supply unit for generating corresponding radicals by applying plasma to a second reactive gas and then selectively supplying the radicals to the reaction chamber or the exhaust line;
 - a radical transfer line for connecting the radical supply unit and the reaction chamber;
 - a second bypass line for connecting the radical supply unit and the exhaust line; and
 - a main purge gas supply unit for supplying a main purge gas to the first reactive gas transfer line and/or the radical transfer line,wherein the radical supply unit comprises:
 - an MFC 2 for controlling the flow rate of the second reactive gas;
 - an MFC 3 for controlling the flow rate of an inert gas;
 - a remote plasma generator to which the MFC 2 and the MFC 3 are connected such that the second reactive gas and the inert gas are fed to the remote plasma generator, the remote plasma generator generating corresponding radicals by applying plasma to the second reactive gas and the inert gas;
 - a second path conversion unit for enabling the generated radicals to selectively flow into the radical transfer line and the second bypass line;
 - an open/close valve installed between the MFC 2 and the remote plasma generator; and
 - an open/close valve installed between the MFC 3 and the remote plasma generator,wherein the second reactive gas and the inert gas are mixed with each other prior to being

fed to the remote plasma generator.

2. (Original) The apparatus of claim 1, wherein the first reactive gas supply unit comprises:

a source container filled with a predetermined amount of liquid first reactant which will be the first reactive gas;

an MFC 1 for controlling the flow rate of an inert gas fed into the source container; and

a first path conversion unit for enabling the inert gas or the first reactive gas to selectively flow into the first reactive gas transfer line or the first bypass line.

3. (Canceled)

4. (Previously presented) The apparatus of claim 1, wherein the radical supply unit further comprises a third bypass line for enabling the second reactive gas to selectively flow through the MFC 2 into the second bypass line.

5. (Original) The apparatus of claim 1, wherein the main purge gas supply unit comprises:

an MFC 4 for controlling the flow rate of the main purge gas; and

a third path conversion unit for enabling the main purge gas to flow into the first reactive gas transfer line or the radical transfer line.

6. (Previously presented) An atomic film deposition method using the remote-plasma atomic film deposition apparatus comprising a reaction chamber in which wafers are loaded, an exhaust line for exhausting gas from the reaction chamber, a first reactive gas supply unit for selectively supplying a first reactive gas to the reaction chamber or the exhaust line, a first reactive gas transfer line for connecting the first reactive gas supply unit and the reaction chamber, a first bypass line for connecting the first reactive gas supply unit and the exhaust line, a radical supply unit which generates corresponding radicals by applying plasma to a second reactive gas and then selectively supplying the radicals to the reaction chamber or the exhaust line, a radical transfer line

for connecting the radical supply unit and the reaction chamber, a second bypass line for connecting the radical supply unit and the exhaust line and a main purge gas supply unit for supplying a main purge gas to the first reactive gas transfer line and/or the radical transfer line, wherein the radical supply unit comprises an MFC 2 for controlling the flow rate of the second reactive gas, an MFC 3 for controlling the flow rate of an inert gas, a remote plasma generator to which the MFC 2 and the MFC 3 are connected such that the second reactive gas and the inert gas are fed to the remote plasma generator, the remote plasma generator generating corresponding radicals by applying plasma to the second reactive gas and the inert gas, a second path conversion unit for enabling the generated radicals to selectively flow to the radical transfer line and/or the second bypass line, an open/close valve installed between the MFC 2 and the remote plasma generator and an open/close valve installed between the MFC 3 and the remote plasma generator, wherein the second reactive gas and the inert gas are mixed with each other prior to being fed to the remote plasma generator, the method comprising:

forming a thin film on a substrate loaded in the reaction chamber by repeatedly performing a first reactive gas feeding step in which the first reactive gas is fed into the reaction chamber and a first reactive gas purge step in which the first reactive gas, fed into the reaction chamber, is purged, in a state where a roughing valve positioned between the reaction chamber and the exhaust line remains open, gases flowing through an inner point A of the first reactive gas supply unit and an inner point B of the radical supply unit continue to flow into the reaction chamber or bypass lines, and radicals are fed into the reaction chamber.

7. (Previously presented) The method of claim 6, after depositing a thin film, further comprising injecting radicals and an inert gas into the reaction chamber to thermally treat the thin film, wherein the radicals are formed of at least one selected from the group consisting of O, N, H, OH, and NH and a combination thereof.

8-10. (Canceled)

11. (Previously presented) An atomic film deposition method using the remote-plasma atomic film deposition apparatus comprising a reaction chamber in which wafers are loaded, an

exhaust line for exhausting gas from the reaction chamber, a first reactive gas supply unit for selectively supplying a first reactive gas to the reaction chamber or the exhaust line, a first reactive gas transfer line for connecting the first reactive gas supply unit and the reaction chamber, a first bypass line for connecting the first reactive gas supply unit and the exhaust line, a radical supply unit which generates corresponding radicals by applying plasma to a second reactive gas and then selectively supplying the radicals to the reaction chamber or the exhaust line, a radical transfer line for connecting the radical supply unit and the reaction chamber, a second bypass line for connecting the radical supply unit and the exhaust line and a main purge gas supply unit for supplying a main purge gas to the first reactive gas transfer line and/or the radical transfer line, wherein the radical supply unit comprises an MFC 2 for controlling the flow rate of the second reactive gas, an MFC 3 for controlling the flow rate of an inert gas, a remote plasma generator to which the MFC 2 and the MFC 3 are connected such that the second reactive gas and the inert gas are fed to the remote plasma generator, the remote plasma generator generating corresponding radicals by applying plasma to the second reactive gas and the inert gas, a second path conversion unit for enabling the generated radicals to selectively flow to the radical transfer line and/or the second bypass line, an open/close valve installed between the MFC 2 and the remote plasma generator and an open/close valve installed between the MFC 3 and the remote plasma generator, wherein the second reactive gas and the inert gas are mixed with each other prior to being fed to the remote plasma generator, the method comprising:

forming a thin film on a substrate loaded in the reaction chamber by repeatedly performing a radical feeding step in which radicals are fed into the reaction chamber, a radical purge step in which the radicals are purged from the reaction chamber, a first reactive gas feeding step in which the first reactive gas is fed into the reaction chamber, and a first reactive gas purge step in which the first reactive gas is purged from the reaction chamber, in a state where a roughing valve positioned between the reaction chamber and the exhaust line remains open and gases flowing through an inner point A of the first reactive gas supply unit and an inner point D of the radical supply unit continue to flow into the reaction chamber or bypass lines,

wherein the radical purge step comprises injecting only a radical corresponding to the inert gas (excluding the second reactive gas), which flows through the remote plasma generator, into the reaction chamber by way of the radical transfer line.

12. (Original) The method of claim 11, wherein the sum of the flow rate of the inert gas flowing through the first reactive gas transfer line and the radical transfer line is maintained at a constant level during the first reactive gas purge step.

13. (Previously presented) The method of claim 11, after depositing a thin film, further comprising injecting radicals and an inert gas into the reaction chamber to thermally treat the thin film, wherein the radicals are formed of at least one selected from the group consisting of O, N, H, OH, and NH and a combination thereof.

14. (New) A remote-plasma atomic film deposition apparatus comprising:
a reaction chamber in which wafers are loaded;
an exhaust line for exhausting gas from the reaction chamber;
a first reactive gas supply unit for selectively supplying a first reactive gas to the reaction chamber or the exhaust line;
a first reactive gas transfer line for connecting the first reactive gas supply unit and the reaction chamber;
a first bypass line for connecting the first reactive gas supply unit and the exhaust line;
a radical supply unit for generating corresponding radicals by applying plasma to a second reactive gas and then selectively supplying the radicals to the reaction chamber or the exhaust line;
a radical transfer line for connecting the radical supply unit and the reaction chamber;
a second bypass line for connecting the radical supply unit and the exhaust line; and
a main purge gas supply unit for supplying a main purge gas to the first reactive gas transfer line and/or the radical transfer line,
wherein the radical supply unit comprises:
an MFC 2 for controlling the flow rate of the second reactive gas;
an MFC 3 for controlling the flow rate of an inert gas;

a remote plasma generator to which the MFC 2 and the MFC 3 are connected such that the second reactive gas and the inert gas are fed to the remote plasma generator, the remote plasma generator generating corresponding radicals by applying plasma to the second reactive gas and the inert gas;

a second path conversion unit for enabling the generated radicals to selectively flow into the radical transfer line and the second bypass line;

an open/close valve installed between the MFC 2 and the remote plasma generator;
and

an open/close valve installed between the MFC 3 and the remote plasma generator, wherein the second reactive gas and the inert gas are adjustably combined with each other to have a variable mixing ratio before being fed to the remote plasma generator.